



FANSTEEL METALS SITE
June 4, 2020

Environmental Concerns

▶ Groundwater

- ▶ TCE, radionuclides, and metals present above benchmarks
- ▶ Trichloroethylene exceeds Maximum Contaminant Level in 3 wells (max 540 µg/L)

▶ Surface Water

- ▶ On-site surface water had exceedances in metals and radionuclides
- ▶ Off-site surface water exceedances for iron, manganese, and nickel
 - ▶ radionuclides were detected in SW pathway

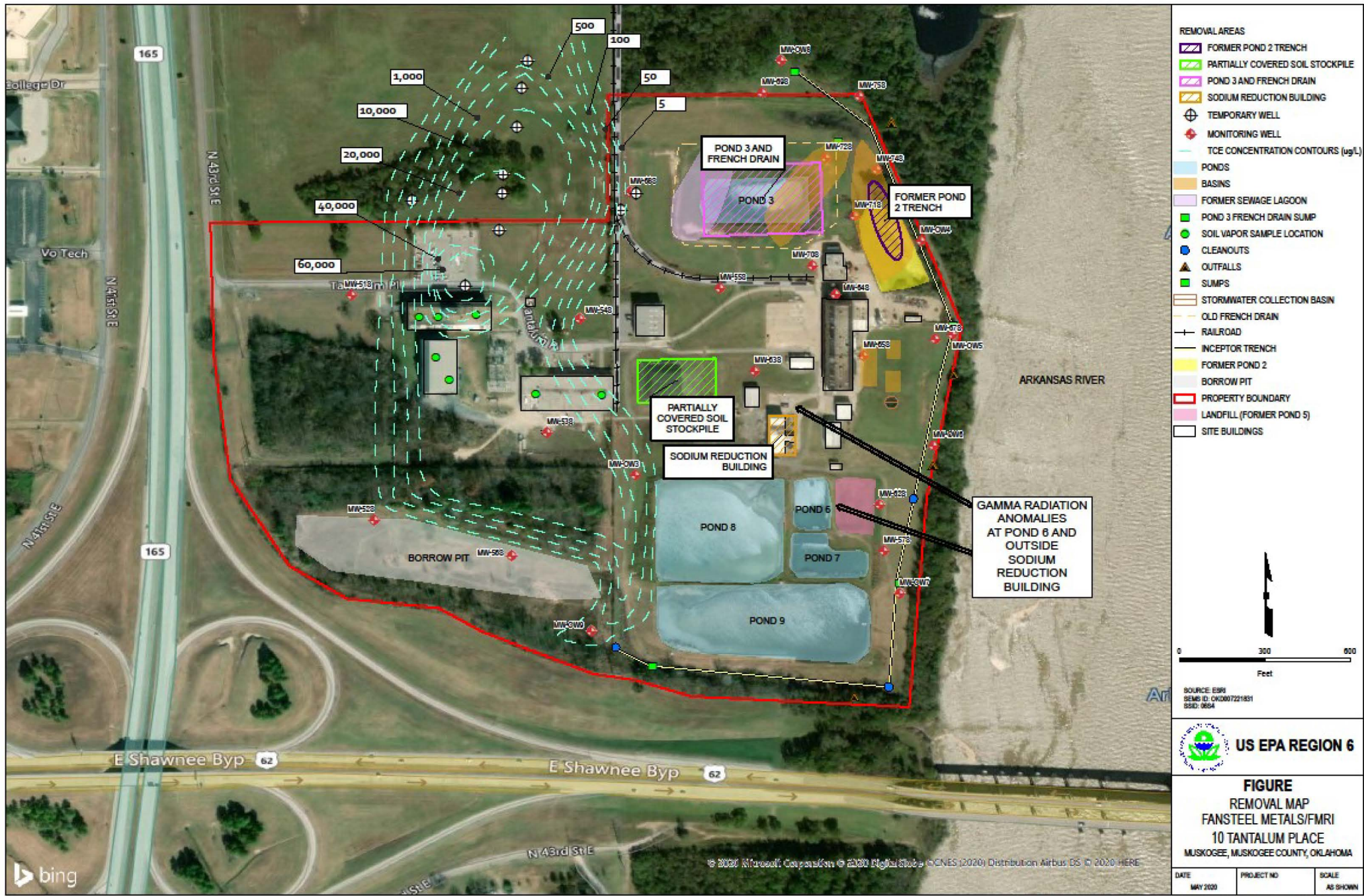
▶ Radiation

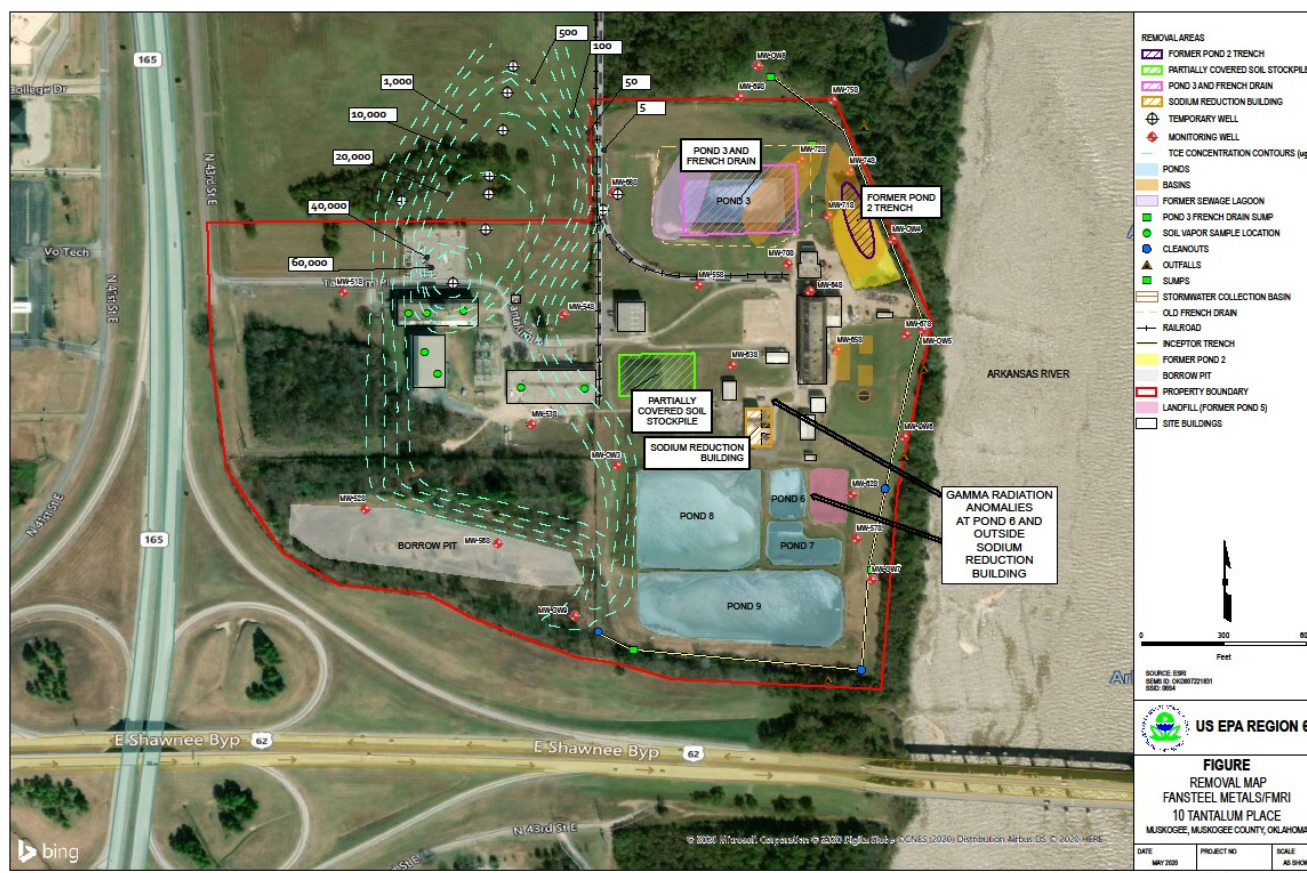
- ▶ Surface contamination throughout site and in buildings
- ▶ Gamma scans from July 2019 show areas up to 45 times background
- ▶ Quantitative risk is unknown

Potential Removal Program Options

Complex Site

- ▶ Areas under evaluation:
 - ▶ Anomalies of unknown sources
 - ▶ Outside the Sodium Reduction Building
 - ▶ Levee of Pond 6
 - ▶ Open trench (formerly Pond 2 now filled with waste and capped except for open trench). Supersacks in Sodium Reduction Building
 - ▶ Supersacks of radioactive soil stored in Sodium Reduction Building
 - ▶ Partially covered soil stockpile
 - ▶ Ongoing wastewater treatment to remove radioactive isotopes



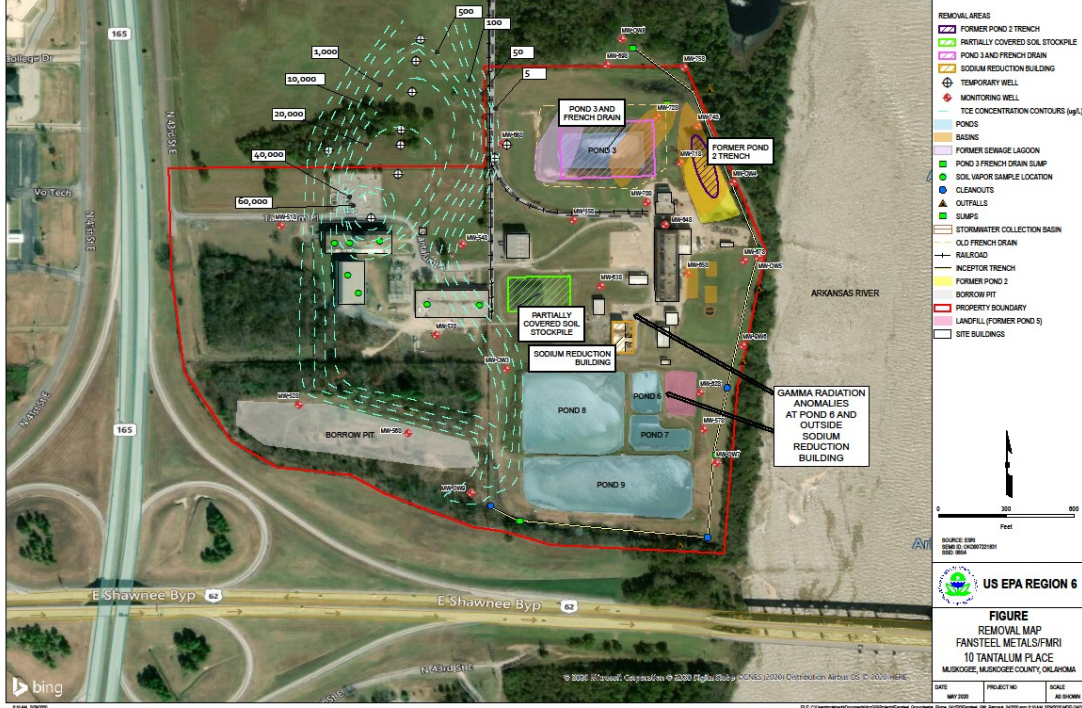


Former Pond 2, trench (45X background, highest outdoor exposure on site)

Former Pond 2 fill consists of 10-12' of rad waste from this and other process ponds on a native clay liner. FMRI attempted to dig up the waste and send it off for recovery of uranium resulting in partial removal of the cap.

Options:

Temporarily close using contaminated soils from site and cap with clean soil and HDPE liner (Need Oklahoma buy-in for this). Site can manage approximately 6,000 cubic yards at current height. Cost to move soils on-site approximately \$10/yard - \$60,000-\$80,000.

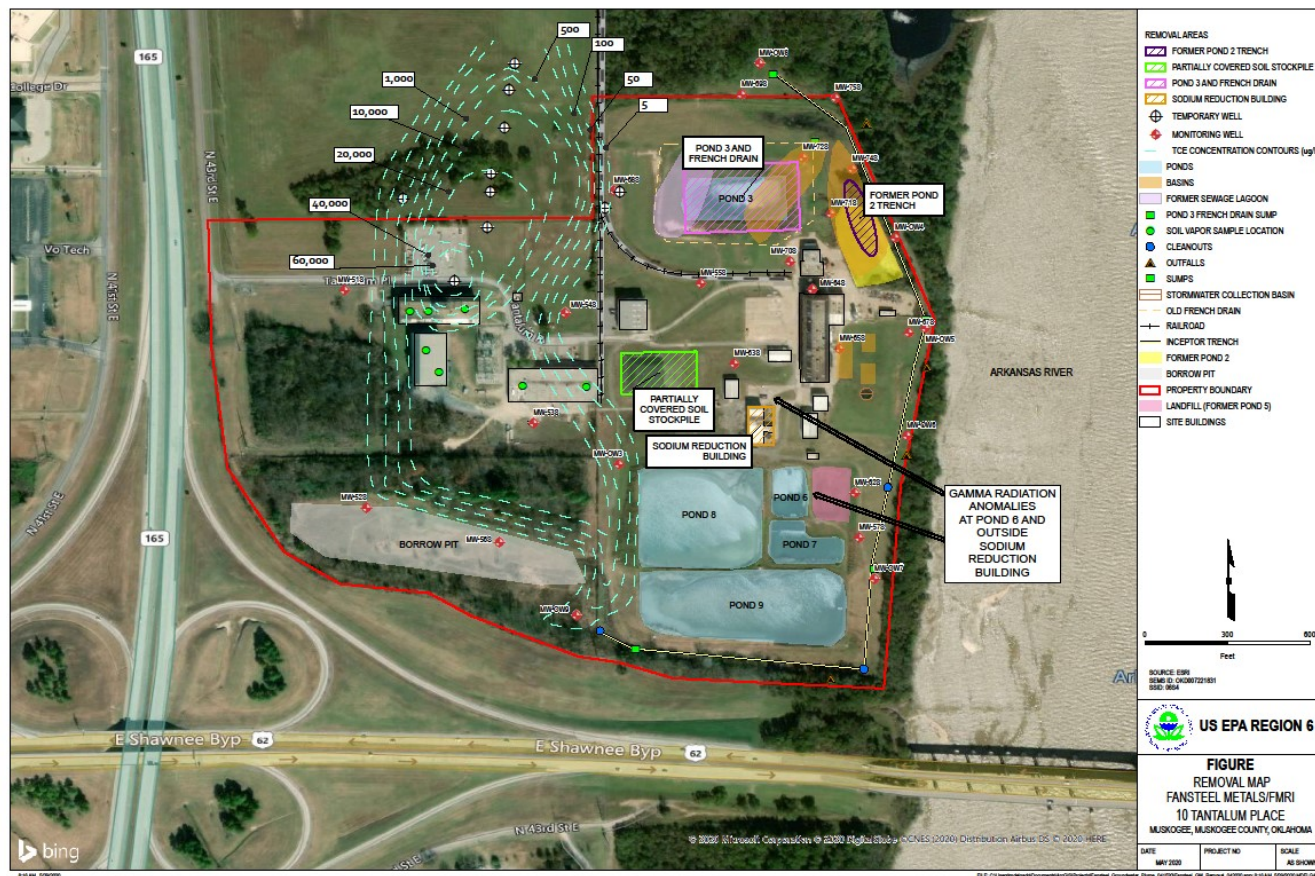


Supersacks in Storage Sodium Reduction Building (gamma not measured)

The second hottest area on the site. Estimated 2000 sacks piled 10 levels high. Sacks contain soil removed by Fansteel from former Pond 1 (now closed and qualitatively clean based on EPA radiation survey)

Potential Actions:

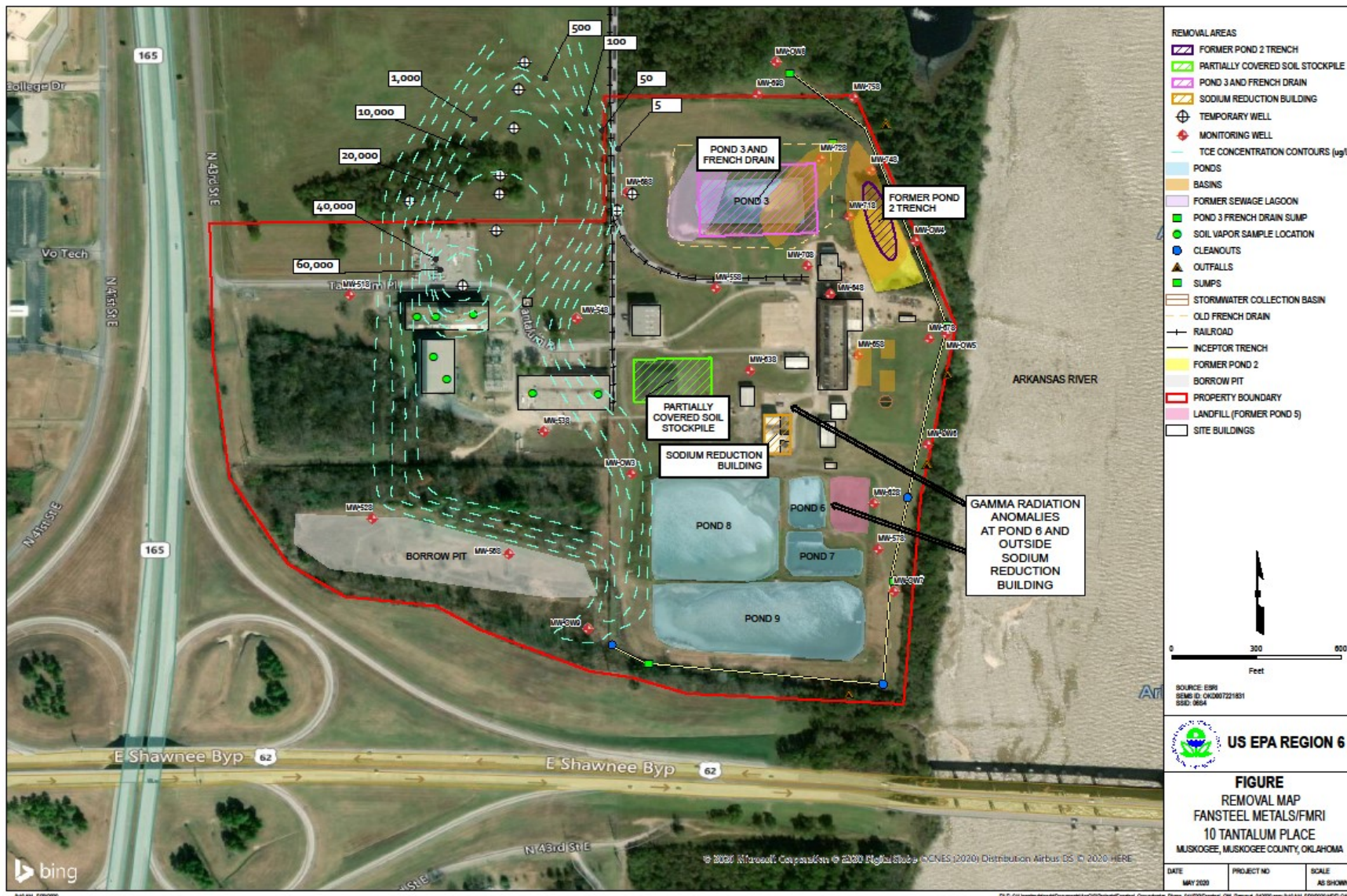
- Temporary storage in open trench at Pond 2 (defacto temporary repository \$30,000-\$50,000)
- Disposal White Mesa, UT \$1,675,000
- Leave in building and surround building with a shielding wall
- No action



Soil stock pile south of bldg 4 (27X background)

Radioactive waste removed from old french drain system and stockpiled on a hdpe liner and covered with hdpe liner. Top liner is damaged, ripped and only partially covered with soil as shielding. Options:

- Cover old liner with sand to shield and top all with new liner (estimated cost \$68,000-\$80,000)
- Determine if this soil is suitable to close the existing open trench at the Former Pond 2; making that a defacto temporary on-site repository (volume may be too high to accept at current height)
- Off site disposal, White Mesa, UT \$11,675,000



Wastewater Treatment

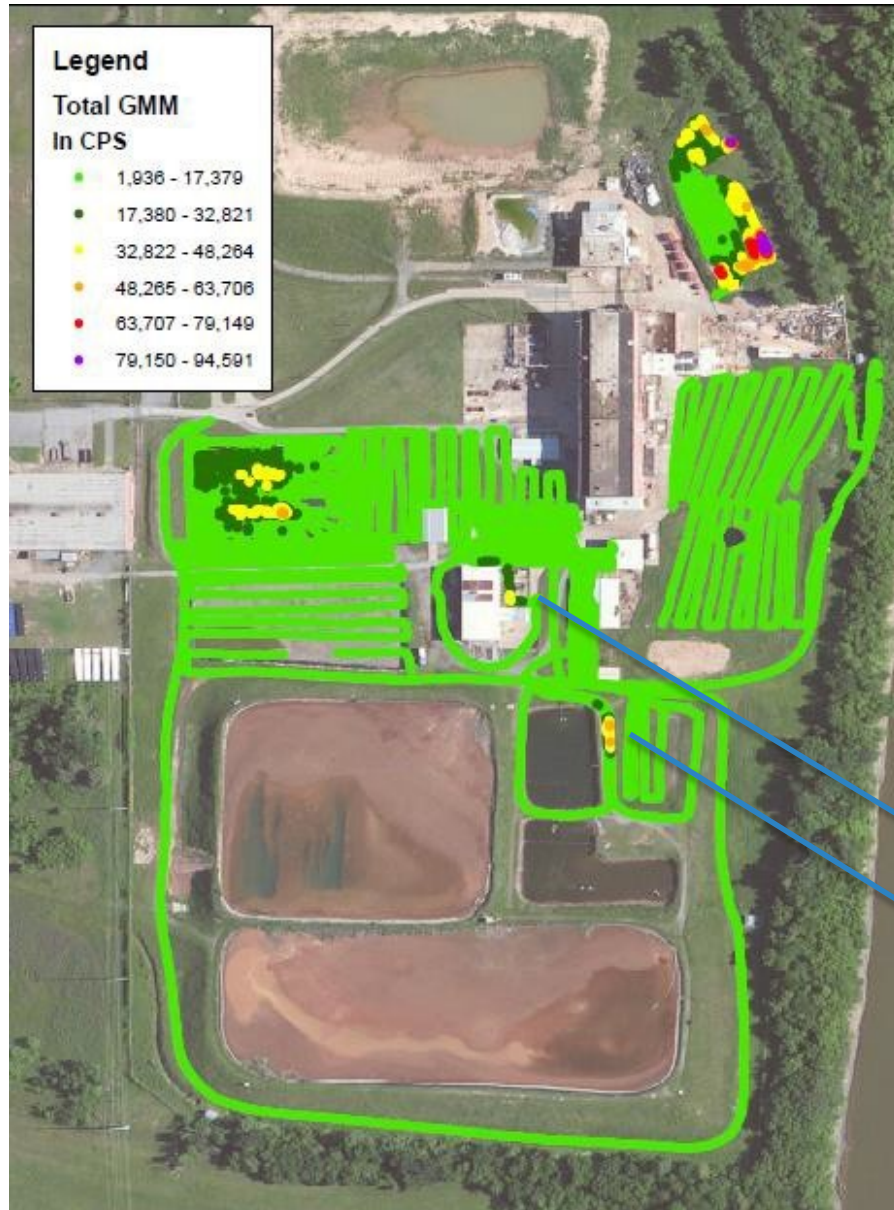
Groundwater collected in interceptor trench for treatment is combined with surface water from Pond 3 and Pond 3 french drain. Prevents contaminated groundwater from reaching Arkansas River.

ESI showed significant contamination with radioactive isotopes.

Options (these options all require more study):

- Construct new lower maintenance wastewater treatment
- In-situ treatment to reduce risk
- Close and cap Pond 3 (contaminants of concern: fluorides, ammonia, radionuclides)
- Continue to run as is

Additional Data Needs



Our scans are qualitative:

- ❖ What do the colors signify?
Sampling will tell us the concentration of the radioactive isotopes. We can then link our previous scans with quantitative data.
- ❖ What is the depth of contamination?
Need for two areas where contamination was not deliberately placed by Fansteel.

Outside Sodium Reduction Building (17 X background)

Levee of Pond 6 (25X background)

Recommend: Sample to identify and evaluate rad sources for potential removal.

Challenges

NRC estimated cleanup cost at approximately \$78 million (2015 dollars)

According to NRC, EPA can move contaminated soils to temporary storage on-site under the existing FMRI license if actions will reduce the likelihood of dispersion, and/or reduce worker and public exposure

On-site storage of contaminated material should meet the NRC criteria for ALARA (As Low As Reasonably Achievable) and must be temporary only.

EPA movement of material on site will require letters of agreement between EPA and NRC at a minimum or potentially, a revised EPA/NRC MOU.

According to multiple reports, ODEQ has been averse to storage of radioactive material on-site at other nearby facilities and would likely be averse to storage here.

Capping the existing radioactive isotope storage in Former Pond 2 (closing the trench) will require coordination with EPA Headquarters per a 2000 memo.